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Dossier Évolution et créationnisme
Creationism and Intelligent Design: a critique

John Buckeridge

Professor of Natural Resources Engineering, Head of School Civil, Environmental and Chemical Eng, RMIT University, GPO Box 2476V, Melbourne VIC 3001, Australia

Growing anti-evolution sentiments from within a sector of the United States population led to the Scopes trial in 1925. The trial, pitting fundamentalism against science, revolved around John Scopes, an itinerant biology teacher, who had used a science text that discussed evolution. Lasting over a week, the trial was somewhat of a fiasco, as the defence asked that Scopes be found guilty (anticipating the opportunity for appeal at a higher court). The appeal was successful (on a technicality), but nonetheless stopped the "anti-evolution movement" in its tracks for almost 80 years. The Creationist movement was relatively quiet over subsequent years, but has recently rejoined the debate, with a new twist – "Intelligent Design" (ID)[1].

A key component of Darwinian Evolution through natural selection is that life arose from non-living matter. In contrast, the basis of intelligent design is that life is too complicated to have been created by natural selection and thus must have had a designer. In this repackaging of creationist dogma, ID has also (in part) dispensed with the notion of a "young earth" (*vide* Archbishop Ussher's 4004BC); further, many ID proponents contend that the nature of the designer is unknown, *i.e.* distancing the argument from any legal challenge (US Federal Law forbids the teaching of divine creation in state-funded schools).

Importantly, ID adherents in the US are advocating the teaching of ID in science classes on an equal footing with natural selection. This implies that ID is a science. However, if we accept that science is conducted objectively, involving the systematised observation of and experimentation with phenomena, we can expect a scientific theory, in principle, to be falsifiable, *i.e.* there must be the potential for conditions under which the theory becomes untenable. In which case, a new theory to account for the observations is proposed. This process is fundamental to the advancement of science, and has been reflected in many scientific paradigm shifts; *vide* Newtonian Physics being superseded by the Theory of Relativity. ID is clearly not science – indeed, its proponents do not claim that it may be falsified, although, some like William Dembski[2] claim that "design" (*i.e.* through intervention of a supernatural body) is a "legitimate and fundamental mode of scientific explanation..." Dembski and his ilk are thus redefining science from an empirically based discipline to one based upon theology.

The essence of ID, according to proponents like Michael Behe[3], resides within concepts such as "irreducible complexity", *i.e.* wherein certain molecular systems are too complex to arise by chance. In one of his more quoted examples, he cites the rather large number of proteins required for blood clotting in mammals – an intricate cascade of molecular interaction, with clotting only occurring when the entire cascade of factors is assembled. With some rigor, Behe states that "no one on earth has the faintest (idea) how the coagulation cascade came to be"[3]. However, practicing biochemists can demonstrate that the genes responsible for the clotting cascade were formed by duplication and modification of pre-existing

Corresponding author: john.buckeridge@rmit.edu.au
John Buckeridge is also the President of the International Union of Biological Sciences.

[1] Voir dans ce numéro le texte d'introduction d'A.-F. Schmid, l'article de J. Daillie « Évolution *vs* Création », et celui de F. Fridlansky et J.-C. Mounolou « Pourquoi dire "non" au "créationnisme" ? ». À lire également dans *NSS*, vol. 15 nº 2, l'éditorial de C. Friedberg, et dans le vol. 15 nº 3, le premier volet du dossier « Créationnisme ».

[2] Behe, M.J., Dembski, W.A., Meyer, S.C., 2000. *Science and Evidence for Design in the Universe*, San Francisco, Ignatius Press.

[3] Behe, M.J., 1996. *Darwin's box Black Box*, New York The Free Press.

Table 1. Understanding the barnacle group Ibliformes over two centuries.

Leach, 1825[5]	**Darwin, 1851**[6]	**Buckeridge & Newman, 2006**[7]
Order Campylosomata	Order Thoracica	Order Iblifomes
Family Iblidae	Family Lepadidae	Families Iblidae, Idioiblidae
Ibla (only one species known)	*Ibla* (one of 11 genera)	Five genera (*Ibla*, *Neoibla*, *Chaetolepas*, *Idioibla*, *Chitinolepas*)

genes[4], and it is now known that agnathid fish require significantly fewer proteins for clotting than higher vertebrates. Further, leading biochemist Russell Doolittle has been able to demonstrate that a fibrinogen-like sequence arose independently in the Echinodermata[4].

ID criticises evolution as a "top down" process, wherein higher taxonomic divisions such as phyla, appear "suddenly", often with no known intermediate forms to link with their precursors. However this criticism is somewhat unjustified, because although palaeontologists and biologists make considerable use of higher taxonomic divisions, they do so simply because this provides a framework through which they can assess relationships between taxa at all levels. As scientists refine their understanding at species level, the status and nature of higher divisions must evolve to accommodate the new knowledge. This is the essence of science. An example showing how the status of higher divisions change in time is provided in Table 1. The tiny stalked barnacle *Ibla* is widely distributed in shallow temperate and tropical waters. There was only one species of *Ibla* known to Leach, for which he erected the Family Iblidae in 1825. On the basis of his understanding of barnacle evolution, Darwin revised this, and in 1851 included *Ibla* (at that time comprising two species) with all other stalked barnacles as the Lepadidae. In 2006, new material, complemented by a greater understanding of the molecular biology of the Ibliformes, permitted elevation of the Iblidae to ordinal level, along with five new genera.

The concept of an early Cambrian "explosion of new species" is now an issue of much debate amongst scientists. There are many who now believe that it took place over tens of millions of years, rather than abruptly, as was believed in the mid to late 20th Century. We should expect this refinement, for as more comprehensive molecular and palaeontological data have become available, previously unknown aspects of the evolutionary plan are clarified, *i.e.*, there is an appropriate shift in the evolutionary paradigm to accommodate this new knowledge. What is clear, and has been so for many years, is the broad trend of increasing organic complexity that is demonstrated by the fossil record. The first known organisms are clearly not complex metazoans. We can, with considerable confidence, reconstruct key phases in environmental evolution, *e.g.* the first living organisms occurred on Earth c. 3.6 billion years ago, photosynthesis began c. 3.0 billion years ago, and 2.5 billion years ago oxygen levels in the atmosphere were sufficiently high to change the pace of evolution. It is widely known that relatively complex organisms such as *Ibla* (above) did not first appear at the opening of the Cambrian. Rather, they were derived from primitive crustaceans that were present at that time.

To date, ID has tended to force its dogma through reference to single observed outcomes. If a particular observation is subsequently falsified, ID proponents simply reorganise around some other observation that supports their thesis. This is a very different process to that adopted in science – and one that is not particularly conducive to scientific debate. This has led to frustration amongst many scientists, as to date, there is no empirical way in which the case for (or against) ID can be assessed. As a result, most scientists simply ignore, or dismiss ID as irrelevant.

It is now opportune to contemplate the real implications of ID. Through rejection of natural selection, ID necessitates some form of super-naturalism. From this it is a logical conclusion to accept that all that we observe (and experience) in nature is to some degree "pre-ordained". This should give cause for alarm, for it is only a short move towards fundamentalist fatalism, which will result in abdication of a duty of care – towards other cultures, creeds and the natural environment. This is unacceptable and is totally incompatible with one of the highest, and ennobling of human aspirations: environmental stewardship. The effects upon science would be catastrophic too, as the essence of science is open enquiry and a quest for truth. If there was widespread adoption of the principles of ID, the inability of ID to demonstrate any level of, or commitment to empiricism, would ensure that the scientific process would come to an abrupt halt. In light of this, one must question the objectives of the ID movement.

[4] Miller, K.R., 1999. *Finding Darwin's God*, New York, Harper Collins.

[5] Leach, W.E., 1825. A tabular view of the genera composing the Class Cirripedes, with descriptions of the species of *Otion*, *Cineras* and *Clyptra*, *The Zoological Journal*, 2, 6, 208-215.

[6] Darwin, C., 1851. A Monograph On the Sub-Class Cirripedia, with Figures of all Species: The Lepadidae, or cirripedes. Pedunculated Cirripedes, London, Ray Society.

[7] Buckeridge, J.S., Newman, W.A., 2006. A revision of the Iblidae and the pedunculate barnacles (Crustacea: Cirripedia: Thoracica), including new ordinal, familial and generic taxa, and two new species from New Zealand and Tasmanian waters, *Zootaxa*, 1136, 1-38.